

# COAL MINING

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Pilgrim Coal Co. boosts production with  
Michigan Tractor Shovels from *Highway*



2 Michigan 175As work as a team to speed coal handling.



Tractor-Shovel loads coal into Lippmann Crusher.  
The latter is another of the fine equipment  
lines sold, serviced, guaranteed by Highway.

- Busiest...fastest equipment at Pilgrim Coal Co., Volant, are 2 Model 175A Michigan Tractor Shovels.

- These all-wheel drive, rubber-tired units have 3 cubic yard bucket capacity...133 h.p....24,100 lbs. of balanced weight that makes "child's play" of the toughest digging. Ask your Highway representative today for full profit facts about this most efficient, modern equipment.

AA-4501



There's well over 3 cubic yards in this bucket.

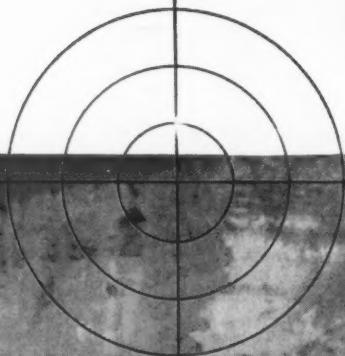
*Highway*

**HIGHWAY EQUIPMENT COMPANY**

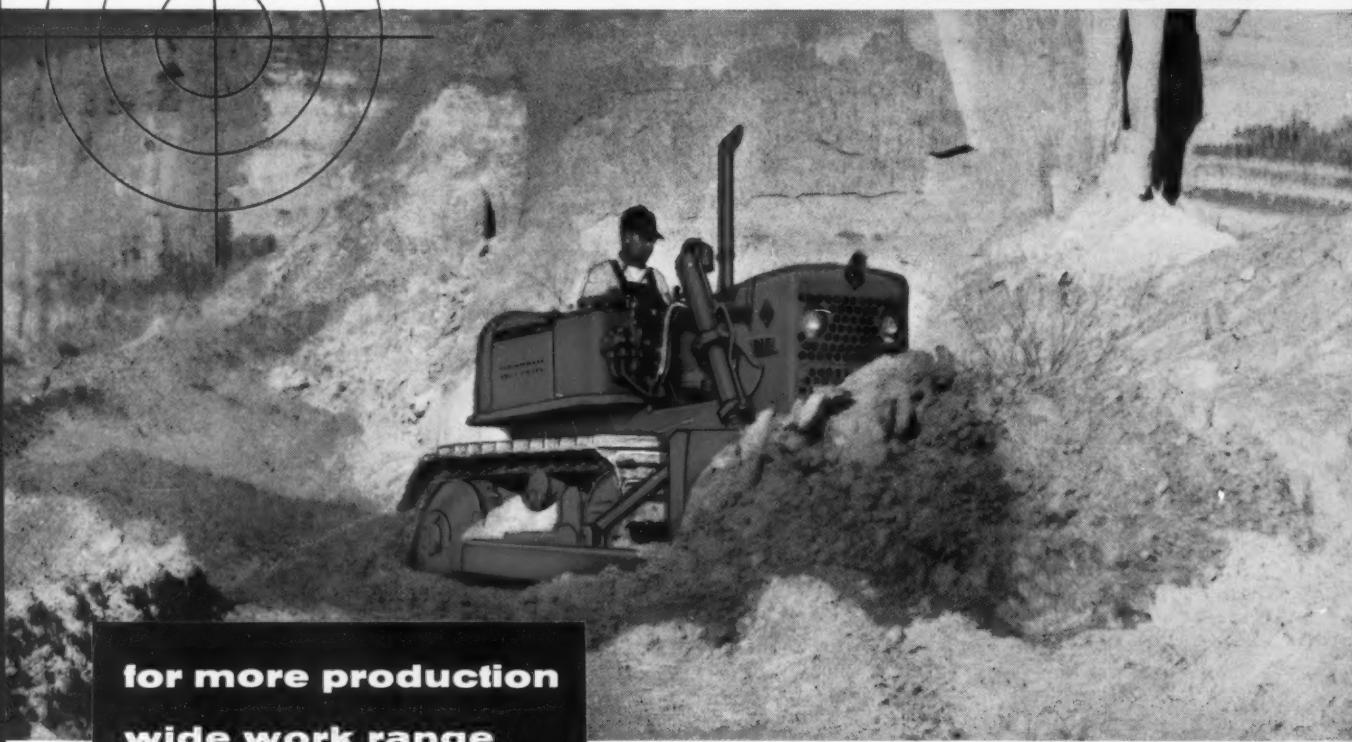
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Allis-Chalmers • International Vibro-Tampers • Erie Bins  
General Motors Diesel Engines • Power-Pack Conveyors  
Gar Wood • Lima Shovels, Cranes, Draglines • Master  
Michigan Tractor Shovels and Excavator-Cranes  
Thor • Jaeger





# Set your sights on an **HD-6B**



**for more production  
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low job costs**

**52 drawbar hp — 63 belt hp — 15,540 lb  
(with dozer) and all these exclusive on-the-job advantages important to owners and operators.**

**All-steel, box-A main frame —** soaks up shock loads.

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**Straddle-mounted final drives —** with bearings on both sides of gears to maintain gear tooth alignment.

**Heavy-duty truck frames —** keep tracks in line, reduce wear . . . help get more work done at lowest possible cost.

**Allis-Chalmers long-life diesel engine —** with follow-through combustion that delivers power for big

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**Simplified lubrication —** including 1,000-hour lubrication intervals for truck wheels, idlers, and support rollers . . . provides extra working time.

**Unit construction —** makes service easier, faster . . . major units can be removed without disturbing adjacent assemblies.

**Operator ease and comfort —** with foam rubber seats . . . responsive controls . . . full visibility.

**Wrap-around radiator guard —** serves as dozer lift frame . . . reduces weight and cost, produces superior balance for tractor-dozer.

**Engine-mounted bulldozers —** direct lift . . . positive down pressure . . . hydraulic straight blade or angle blade.

Plus heavy-duty, tapered roller bearing truck wheels, heavy duty truck wheel guards, 24-volt direct electric starting, crankcase guard, bumper, and lights at no extra cost.

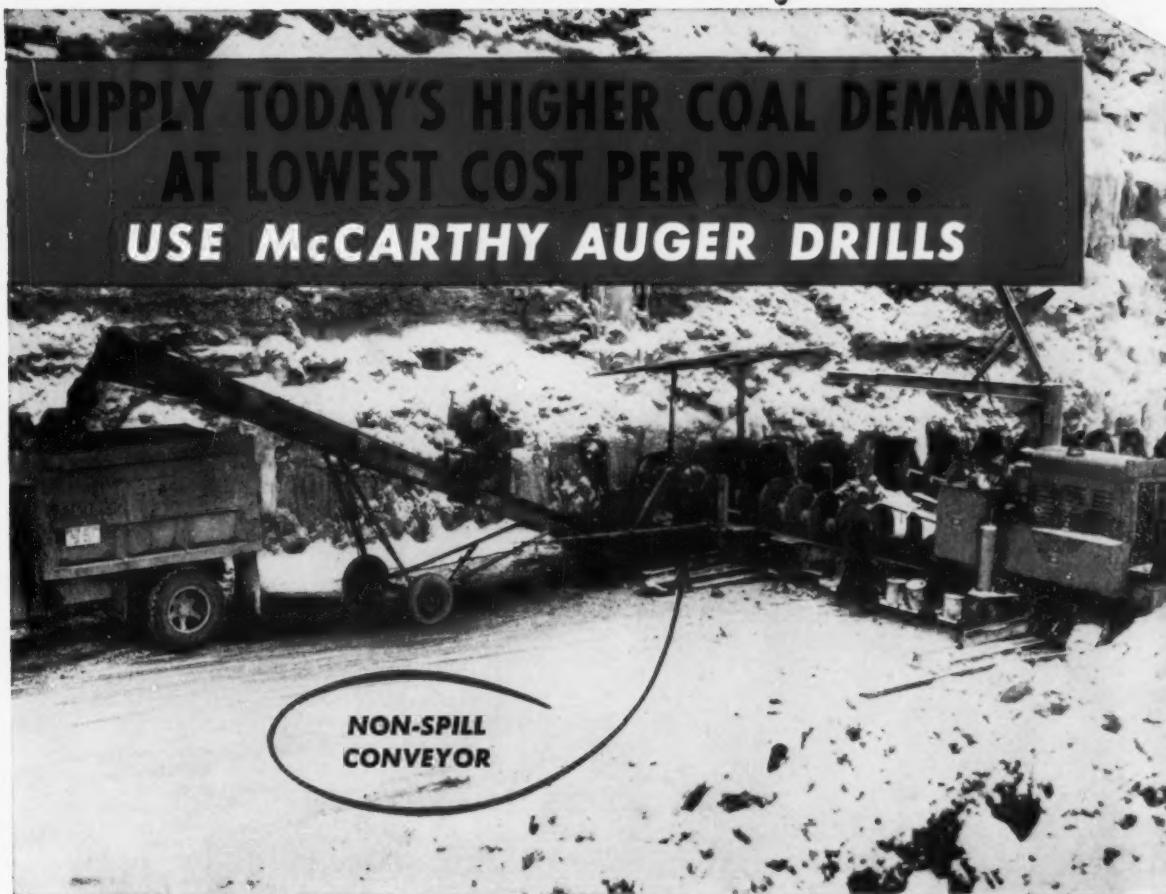
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# ALLIS-CHALMERS





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### SELF-MOVING FROM HOLE TO HOLE

#### FINGER-TIP CONTROL



Gives Desired Rotating Speed Of Auger



Provides Any Speed Up To 6 Feet Per Minute Horizontal Feed Of Drill

Today's increasing demand for coal and the low operating cost of McCarthy Coal Recovery Drills is a profitable combination.

Two men operate the drill augering 60 to 75 tons of coal per hour with the McCarthy Model 1436—42x12 ft. drill pictured above. Holes are 42" in diameter; 144 ft. deep. This drill is equipped with McCarthy Safety Auger Guide which directs auger into coal seam without any climbing or jumping of auger.

Twelve different models of McCarthy Coal Recovery Drills mine this low-cost "bonus coal." Auger diameter ranges

from 16 in. to 42 in.; auger sections are 6 ft., 12 ft., or 24 ft. long.

A new auxiliary conveyor—at the boring end—eliminates spillage at the hole. It operates from either side of the drill. This permits working right to the end of a blind cut. When the cut is open at both ends, it permits working from the side nearer to access roads, saving time and mileage for the trucks.

Contact your nearest Salem Tool Co. distributor, or write for Bulletins M-101 and M-102 for detailed information on the complete line of McCarthy Coal Recovery Drills.

MANUFACTURERS OF DRILLING EQUIPMENT SINCE 1901

# THE SALEM TOOL CO.

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# NOT 1...NOT 2...BUT 3 CATERPILLAR<sup>®</sup> D9 TRACTORS



Caterpillar D9 Tractor equipped with  
No. 95 Bulldozer removes overburden  
for A. W. Lotze near Enon Valley, Pa.

## ABILITY TO GET JOB DONE AT LOWEST COST REASON FOR REPEAT PURCHASES...

**A.** W. "Augie" Lotze, owner of A. W. Lotze Contracting Co., says, "My 20 years' experience in coal operations have proved to me Caterpillar equipment has the ability to get the job done at lowest cost. There's less down-time and more good profit-producing work in Caterpillar-built tractors. The Cat D9 bulldozer is a real coal stripping machine and I've just bought my third D9 because of the high work output of the first two units."

**T**he Caterpillar D9 Diesel Tractors purchased by the A. W. Lotze Contracting Co. have been working at A. W. Lotze Mine #2 in Lawrence County, Pa. There is approximately 55' of overburden consisting of clay and sand. The Cat D9's operate nine hours a day, seven days a week in opening cuts, benching for dragline and dozing overburden. Operators particularly like the hydraulically boosted steering and brakes, superior visibility and smooth "live shaft" drive for cable controls. They claim the D9 is as easy to handle as most smaller tractors.

# CATERPILLAR\*

D9—MORE POWERFUL  
FOR BIGGER PRODUCTION

# Purchased in 10 Months BY A. W. LOTZE Contracting Company



**F**lywheel horsepower of the Cat D9—first turbocharged engine on any tractor—has been boosted from 286 to 320 HP. Drawbar rating of the direct drive model has been increased from 230 to 260 HP. This increased horsepower means even greater productivity and lower cost per unit of production. The D9 is available with torque converter or oil clutch drive, and with straight or angling bulldozer to fit your job.

**O**ver 50 Caterpillar D9 Diesel Tractors have been delivered to coal strippers in Western Pennsylvania since this model was introduced a year ago. Repeat purchases of D9 tractors by the same owners is one of the best testimonials to its ability to "get the job done at lowest cost." If you want to speed your stripping operations . . . cut "down-time" . . . increase production and profits . . . investigate the Caterpillar Diesel D9 tractor. We'll be glad to prove its value to you—either on paper or actually on your job.

NAME THE DATE . . .

WE'LL DEMONSTRATE

**BECKWITH**  
**MACHINERY CO.**

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BRADFORD, PA., 361-369 Congress Street, Phone 3166

CLEARFIELD, PA., Old Town Road, Phone 5-9635

FARRELL, PA., East Broadway, Phone Sharon 3572

CLARKSBURG, W. VA., Buckhannon Pike (South on Route 20), Phone Clarksburg 4-5476



### Long Reach Dragline

Big capacity Manitowoc Model 4500 has exceptional stability . . . Easily handles 4 to 6 yard bucket with 120 to 140 foot boom . . . Manitowoc's longer reach means less re-handling — greater output.

## More Power • Mobility • Output

Miners throughout the world have found that they get *really profitable* stripping performance from the rugged, versatile Manitowoc 4500. Either as a dragline or shovel, Manitowoc means fast, economical stripping, regardless of the composition of the overburden.

Manitowoc, with a single diesel power package, is not hampered by the power loss in prime movers and D.C. generators found in electric rigs, and its simple design permits use of that *extra* power exactly where and when it is needed. In a Manitowoc, there are only four main shafts and 15 gears, and only *working* gears turn!

You get greater mobility with a Manitowoc — faster moves between job locations. You don't need cumbersome trailing electrical cables or extensive

power networks . . . your Manitowoc will operate anywhere. The entire unit can be disassembled, moved and set up again by your regular mechanics in a matter of days.

Faster cycle speed boosts output. Torque converter drive provides precise control, balanced power loads and unlimited speeds without shifting. The torque converter matches engine power to the load so the engine cannot stall, cannot be overloaded.

Greater yardage means greater profit to you — and the Manitowoc 4500 is specially designed for big yardage mining. See why leading mines everywhere use Manitowocs. Get full details from your Manitowoc distributor.

**Manitowoc Engineering Corp., Manitowoc, Wisconsin.**



### Hi-Lift Shovel

A 5½ yard bucket . . . Extra-strength high tensile steel shovel boom . . . Special 60-foot "Hi-Lift" boom and 37-foot dipper stick provide greater digging and dumping ranges . . . Single, free turning tubular dipper stick rolls through saddle, avoids the stress and strain of unusual digging shocks.

**MANITOWOC**

SHOVELS  
1 - 5½ YD.



CRANES  
20-100 TON

**BASSLER EQUIPMENT CO.**  
FORTY FORT, PA.

**ANDERSON EQUIPMENT CO.**  
BRIDGEVILLE, PA.

**R. H. SMITH CO.**  
BECKLEY, W. VA.

# COAL MINING

Volume XXXIV January, 1957 No. 1

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1118 Chestnut Street Erie, Pa. Phone 2-2780

- A new 13 yard Bottom Dump, featuring an overhung engine tractor of 218 h. p. and a top speed loaded of 28.2 m. p. h. has been announced by Euclid.

The S-12 Bottom Dump, rated at 40,000 pounds payload, carries up to 19 yards heaped and makes a non-stop 180 degree turn in 31 feet, 2 inches. Loading height is 9 feet, 5½ inches.

The new unit consists of a standard Euclid 13 yard hopper with a new hitch designed to couple it with Euclid's S-12 overhung engine tractor, making it interchangeable with the S-12 Scraper. It has a five speed transmission, full 90 degree hydraulic steering and 24.00 x 25 tires.

Further information may be ob-

tained from Euclid dealers or from Euclid Division, General Motors Corporation, Cleveland 17, Ohio.

- Two big new rubber-tired scrapers of 18 and 24 yards struck capacity, both of the six wheel type, have been added to the Euclid line and will be displayed for the first time at the Road Show.

Known as the SS-18 and SS-24, they provide larger capacities for long haul, high speed applications where the stability of a four wheel tractor counts.

The SS-18 is an improved and revised version of Euclid's 15.5 yard model, having a longer and lower bowl than the old sideboarded unit. It is rated at 60,000 pounds payload and carries up to 25 yards heaped.

It is powered by either G. M. or Cummins 300 h. p. engines, has standard 24.00 x 25 drive and scraper tires with 29.5 x 25 tires optional. Power train incorporates a 3-speed Allison Torqmatic Drive.

The SS-24 carries up to 31 yards heaped and incorporates an all new tractor powered by either a 300 h. p. G. M. or 335 h. p. turbo-charged Cummins engine, both models having a 4-speed Allison Torqmatic Drive. A pilot model has been in service for a year.

The tractor has a box beam frame, trunion front axle, and employs Euclid's largest planetary drive axle for the first time on a scraper. Standard tires are 27.00 x 33 with 33.5 x 33 tires optional.

### SALEM "HERCULES" AUGERS FOR ELECTRIC DRILLS

Made To Withstand High Drilling Speed Whip And Torsional Strain Of Electric Drills



Drills holes faster - Will not snap off shank or chip points - Outlasts four or five ordinary augers

THE SALEM TOOL COMPANY

SALEM, OHIO, U.S.A.



Helical and Worm Gears for Joy 14BU Loaders  
**BRONZE, HELICAL and WORM GEARS**  
unconditionally guaranteed

**Licking View Tool & Machine Co.**

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Distributed by  
LEE SUPPLY CO. OHIO VALLEY MINE SUPPLY CO.  
Charleroi, Pa. Huntington, W. Va.

### HAZLETON

TYPE "PE"

U.S.B.M. APPROVED PORTABLE PUMP

70 G. P. M. 20 Ft. T. D. H.

34 H. P. 230 Volt D. C.

Overall Length, 30" &amp; 50"

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*Year in . . . year out more and more  
mine operators like Robert Bailey  
rely on *Highway* Equipment!*



At Philipsburg, Robert Bailey, like other leading operators, uses Allis-Chalmers HD-21s for striping, backfilling, building access roads . . .



Michigan 175As load more for Robert Bailey. They are the biggest, most powerful, fastest rubber-tired tractor shovels ever built.

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AA-1508



Allis-Chalmers HD-21's guarantee that work will start on time...end on time at Robert Bailey operation, Philipsburg.



... and Lima 2400s are the last word in dependability!

...see your  
*Highway*  
representative for  
every type of equipment  
you need to mine  
more profitably!



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General Motors Diesel Engines • Power-Pack Conveyors  
Gar Wood • Lima Shovels, Cranes, Draglines • Master  
Michigan Tractor Shovels and Excavator-Cranes  
Thor • Jaeger

175A carries heaping loads

*Heres why  
Euclid Equipment  
cuts hauling  
costs in open pit  
coal mines*

Bottom-Dump Coal Haulers are powered by engines of 200 to 360 h.p.—have 5 and 10 speed transmissions, capacities of 25, 40 and 51 tons and loaded travel speeds up to 40 mph.



Rear-Dump Euclids have rated capacities of 10, 15, 22, 34 and 50 tons—engines of 125 to 600 total h.p., standard 5 and 10 speed transmissions or Torqmatic Drive, spring mounted drive axles, top speeds loaded to 36 mph.

## ✓ **LARGE CAPACITY**

Bottom-Dump Euclid Coal Haulers have capacities of 25 to 51 tons. They are available with large single tires or duals on tractor drive and trailer wheels to meet your particular haulage problem.

Rear-Dump "Eucs", ranging from 10 to 50 ton payload are widely used for overburden removal as well as for hauling coal from pit to tipple. There are 5 models—a complete line to meet every coal or waste hauling requirement.

## ✓ **POWER AND SPEED**

Depending on model, engines are from 128 to a total of 600 h.p. with 5 and 10 speed standard transmission or Torqmatic Drive that consists of a torque converter with a semi-automatic transmission. Top speeds with full payload range up to 36 mph.

## ✓ **DEPENDABLE PERFORMANCE**

Because "Eucs" are designed exclusively for off-the-highway service, they pay off in long life and low maintenance cost. They stay on the toughest jobs longer with less down time for servicing and repairs. Whether they're hauling coal or overburden...on long or short hauls... "Eucs" move more loads at lower cost per ton.

EUCLID DIVISION, General Motors, Cleveland 17, Ohio

**For high production and low cost hauling EUCLIDS ARE YOUR BEST INVESTMENT**

# **Euclid Equipment**

FOR MOVING EARTH, ROCK, COAL AND ORE



## Do You Know?

Two years ago every sixth undergraduate student in college in the United States received money for his education from the Government.

Together with graduate and postdoctoral students, a total of 390,000 young Americans received on the average of \$1,000 each for instruction in all fields of study.

These figures, broken down to show Federal support for science students in higher education in this country, were released by the National Science Foundation. They were made public to help planners evaluate proposals for Government-financed scholarship programs now being considered. Such programs might be one answer to solving the current scientific manpower shortage.

The report shows that the more advanced a student is in his scientific training, the greater his chances for receiving Government aid.

While only 82,000, or one-fourth, of the undergraduates receiving aid were pursuing scientific studies, approximately one-half or 18,000 graduate students and virtually all, 1,300, postdoctoral students receiving aid were preparing for careers in science.

By far the greatest aid was given through veterans' educational benefits. Practically all of the undergraduate students in all fields receiving Government money were veterans of the Korean conflict, studying under Public Law 550.

The report also shows that more than one out of every three students receiving Federal aid for graduate work was employed as a research assistant.

• Automation, made possible by electronics in which computers figure in a major way, will bring these major developments predicted by Dr. W. L. Barrow, Sperry vice-president for research and development, for the next five years:

Computers with speeds ten times as great as those presently in use.

Extremely rapid random-access devices, at costs far below comparable existing memories.

Practical language translation machines.

Devices capable of recognizing printed and later possibly hand-written text.

Progress toward the automatic factory and the automatic office. Production operations and paper work will be tied together, saving many intermediate and expensive clerical steps.

Speaking before the New York Society of Security Analysts, Dr. Barrow foresaw increases in the use of automatic devices for operating machines, using feedback control techniques. Processes will be controlled from central points at which human beings will exercise domination through using information automatically gathered and watching operations by viewing industrial closed circuit TV.

In atomic automation, power reactors will be controlled and dangerous "hot" material will be handled remotely. Alarm and safety devices and testing equipment will be automatic.

Just as military development and procurement has established the concept of "weapons systems," Dr. Barrow believes that we are now on the threshold of the concept of "industrial systems" in which all parts of an industrial complex achieve the greatest overall efficiency.

## Here and There in the Coal Industry

• Northern West Virginia Coal Association at its annual meeting Nov. 27 at Fairmont, W. Va., elected the following officers for the coming year: James F. Trotter, president; George R. Higinbotham, W. J. B. Mayo, and Stephen Canonic, vice presidents, and T. E. Johnson, secretary-treasurer.

• Roy E. Dean, assistant to the president of Ayrshire Collieries Corp., Indianapolis, was elected president of the Indiana Coal Association. W. G. Stockton, district sales manager, Walter Bledsoe & Co., was elected vice president. Re-elected were J. A. Thompson as secretary-treasurer; E. B. Agee, labor commissioner; Julian E. Tobey, Jr., as director of engineering, and L. E. Sawyer as manager. Directors of the Association are Hugh Lee, Maumee Collieries Co.; L. B. Girard, Southern Coal Co.; O. L. Scales, The Enos Coal Mining Co.; S. F. Sherwood, Sherwood-Templeton Coal Co.; H. P. Smith, Princeton Mining Co.; and David Ingle, Jr.

• Richard James, of James Bros. Coal Co., was reelected president of the Ohio Reclamation Association at the group's annual meeting held in Columbus. Other officers named included James Benedict, of Benedict, Inc., vice president; James Robb, secretary-treasurer; Larry Cook, executive vice president; Robert J. Kinnard, executive secretary and Ed D. Schorr, counsel. New directors named were Carl O. Tillman, Broken Aro Coal Co., and John W. Taylor, J & T Coal Co. During the luncheon which preceded a forum discussion of industry problems, the Association presented R. L. Ireland, Pittsburgh Consolidation Coal Co., with a special tribute as one of the founders of the organization who is still active as a member of the board of directors.

• "The increasing demand for bituminous coal which has characterized the past two years will show no let-up during the first quarter of 1957," says the New York Journal of Commerce on Dec. 4 in its Quarterly Purchasing Guide. "Contributing to the steadily growing call for soft coal," it adds, "will be the continuation of steel production of near capacity levels, undiminished demand from abroad, and the trend toward increased coal consumption by the fast-growing electric utilities industry."

• George H. Love, president of Pittsburgh Consolidation Coal Co., announced that inasmuch as shareholders representing more than 85% of the 1,020,456 outstanding common shares of Pocahontas Fuel Co., Inc., have accepted the stock exchange offer of Pitt-Consol, the exchange was declared effective. The basis of exchange is 2 1/2 shares of Pitt-Consol common stock for each share of Pocahontas. Shareholders of Pocahontas who have not deposited their certificates will have until Feb. 1, 1957, to effect an exchange, Mr. Love said.

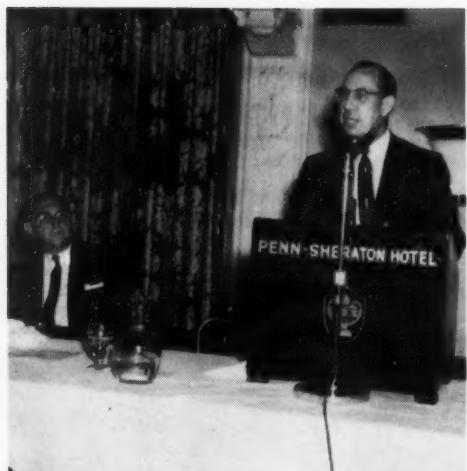
• The board of directors of Pittsburgh Consolidation Coal Co. on Dec. 18 elected George H. Love chairman and named Armstrong R. Matthews as president. Mr. Love has for eleven years been president of Pitt-Consol, which only recently acquired a controlling interest in Pocahontas Fuel Co., Inc., of Pocahontas, Va. Mr. Matthews has been president of Pocahontas since 1951 and he will continue in that post. In addition to filling the chairmanship and electing a president, the board also chose five new directors, as follows: Mr. Matthews, J. H. Bowen and Ernest G. Otey, all of Bluefield, W. Va., Charles Hill Jones of Harrisburg, Pa., and Arthur B. Lawrence, of New York.



J. T. Ryan, President of the Institute,  
Addressing the Banquet.

10th annual meeting of the  
COAL MINING INSTITUTE OF

G. A. Shoemaker, Executive V- Pres.,  
Pittsburgh Consolidation Coal Co., was  
Master of Ceremonies; J. A. Brookes, in-  
coming President is seated on the left.



The 70th Annual Meeting of The Coal Mining Institute of America was held in the Penn-Sheritan Hotel, Pittsburgh, Penna., on December 13th and 14th.

Ten papers on vital mining subjects have been read at the two-day sessions. The Thursday afternoon session under the Chairmanship of J. Allen Brookes, Manager, Mather Collieries, dealing with development of future operating personnel was, in my mind, the most interesting since it dealt with the subject that is bothering the coal producing industry most.

While there are major opportunities for the nonprofessional to contribute in all fields of advancement, emergency reshuffling of our present personnel nor any other make-shift recruitment of personnel not properly trained to meet new developments is not going to help much in our present situation. Our

troubles emerge from a long-standing industrial philosophy that was blind to the needs of brain power, rather than manpower. The human mind is the greatest power on this earth. Human history is filled with records of men with ability to dream up pictures of things needed to perpetuate progress.

The former blind industrial philosophy paid no attention to social problems that entail an obligation to build for the mental future of our country. It ignored the fact that every human being has a right to an opportunity to learn, then earn his share of the good things in life.

As an economic necessity business, local and state government and educators must all help in rebuilding our educational system. The following paper, reprinted from the November 16 issue of SCIENCE comprehensively deals with this problem.

AMERICA

## How Shall We Pay for Research and Education?\*

PAUL E. KLOPSTEG

Population trends in the United States during the past two decades, along with the changing public attitude toward higher education and research, have posed a predicament for our colleges and universities.

The approaching tidal wave of increasing college enrollments—a wave that has already engulfed our lower schools and is lapping the shores of higher education—is giving administrators and governing bodies apprehension and anxiety. The predicament is the inadequacy of operating funds to keep abreast of the rapidly growing needs of the institutions (1).

The report of the Committee on

Institutional Research (2) of the American Council on Education states as fundamental principles that "all accredited institutions of higher learning subscribe with varying emphasis to three primary and essential aims: (a) the *extension* of the boundaries of knowledge; (b) the *conservation* of knowledge already acquired; and (c) the *diffusion* of knowledge through teaching, publication and other accepted

Dr. Klopsteg is associate director of the National Science Foundation. This is the second of two articles on related subjects. The first article appeared in last week's issue of *Science*.

\* Reprinted from November 16 issue of *Science*.

methods of dissemination." It states further that "institutions of higher education are the principal instrumentality through which new knowledge is created by research scholars, existing knowledge is preserved and propagated through libraries and the minds of faculty members and students, and knowledge is disseminated through teaching and publications. In order that they may fulfill their primary and essential functions, institutions of higher learning require the utmost freedom in both their administrative and academic activities."

That these principles are truly fundamental in our society is beyond argument. The preservation of the essential freedom of research and education must be assured. Is it, in fact, assured in the future, or is freedom threatened? If we consider seriously the aforementioned predicament, there is no escape from the view that freedom of research and education, in both its administrative and intellectual aspects, is indeed threatened.

Government agencies are supplying, in growing amounts funds for scholarly research but not to support the teaching function and other primary and essential activities in higher education. If the rapidly growing demands on institutions should bring about increasingly unbalanced budgets, substantial federal support of all education would appear inevitable. Although present support by government of research activities seems to have no concomitant control or intrusion, these are appearing in subtle, though not insidious, ways. They develop almost spontaneously, without plan or intent, simply because the expenditure of government funds calls for safeguards against improper disbursement and

for checks to insure proper use. The exercise of such authority of guardianship of funds almost invariably becomes bureaucratic and can easily develop sinister aspects. If federal aid to education, as well as to research, were to increase by large sums, we could not afford to remain complacent about the likelihood of increasing government control.

Thus, although federal subsidy appears to be a way out of one predicament, it immediately leads into another. Under the irresistible pressures that come with increasing demands on educational facilities, we are not only accepting but actively seeking more government money, notwithstanding the probability that this carries with it increasing government intrusion and eventual control.

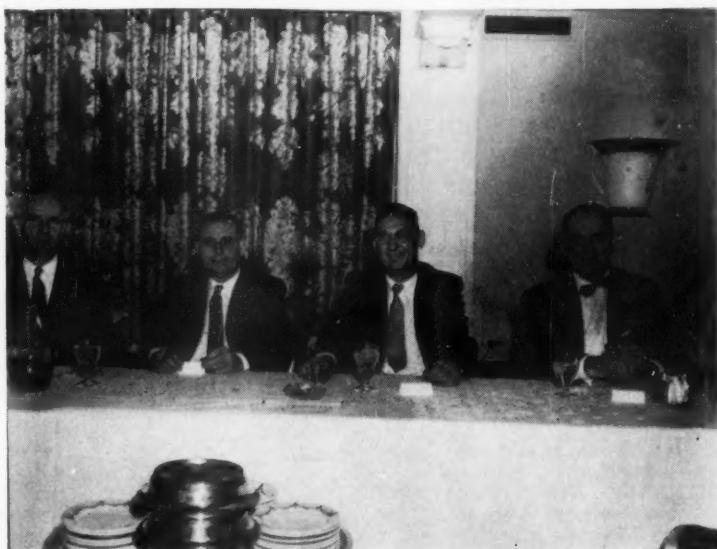
The situation, though serious, is not yet hopeless. A remedy is possible which keeps complete authority of management and direction in the hands of the governing and administrative heads of our schools and colleges, where it belongs, and does not permit it to pass under the heavy hand of some federal agency, where it might easily become lodged.

#### Dilemma of Colleges and Universities

From its very beginnings, our

nation attached great importance to the education of its citizenry. Public policy called for schools, locally founded, supported, and controlled. Colleges in growing numbers were established. Some were privately started and run by religious organizations, some by secular groups, others by municipalities and states. Attempts were made to establish a national university, but the idea of federal support never took root. Indeed, strong sentiment prevails in the Congress, reflecting public sentiment, against federal subsidies for education, especially at the higher levels. Unless some better way is found soon, however, federal money for education may, by default, become the pattern for an attempted remedy for the present and impending difficulties.

Faced with the increasing pressure for more admissions, private institutions may and do take the position that they can accept only so many students, that they are under no obligation to take more, and that they will raise admission standards to limit enrollment. No one expects a college to carry a larger load than its resources allow. It may be suggested, however, that, as an institution organized to serve a public need, it may soon have to find means for expanding its capacity. As private



Left: D. C. Jones, Pennsylvania State University; James Reilly, Hanna Coal Co.; James Westfield, USMB; H. Richard Johnson, Mine Safety Appliances Co.

institutions limit their admissions, the burdens are increased on those supported by taxes. Of the latter, many are under pressure and some are under compulsion to accept all qualified comers, the qualification being a high-school diploma. How can the schools, public and private, under increasing heavy demands, solve the dilemma? All of them should be expanding their facilities now to take care of future student population, which is expected to double in the next 15 years, and probably sooner.

By minor artifices we may defer, but cannot avoid, facing the problem: how shall we finance research and education? These are the solid foundation of the nation's future, and funds for their support must be adequate to provide superior opportunities for gifted students and able scientists. Greater knowledge and fuller understanding in all fields of learning must be the goal. *No equal expenditure of money can bring greater returns for the public benefit.* In no other way can we achieve the freedom that comes from knowing the truth. In no other way can we as a nation hold our own on this overpopulated planet. As we face the problem squarely, we find only one solution: assurance that a sufficient part of our vast national income will flow normally and effectively into edu-

cation, to meet its financial needs as they arise.

In trying to bring this about, should we take the "easy" way? During the past couple of decades, a father complex seems to have come upon many of our citizens, causing them to look to Washington as the ever-present help in time of trouble, especially when money appears to be the remedy. Many people seem to think that money from the Federal Government does not cost anybody anything. The easy way then would be to look to the government to make annual grants to cover all operating deficits in education, under a formula by which funds would be doled out to all institutions, public and private.

To do this by statute would require a highly sophisticated law under which an attempt might be made to secure fair and just distribution, with effective safeguards against abuse. These are almost unattainable specifications. If they were attainable, and if easy money were meted out year after year, the institutions would lean more and more on federal support and depend less and less on their own efforts and resources. The disbursing agency would have the annual task of accurately and objectively budgeting the needs, beginning 2 years in advance; of gaining ap-

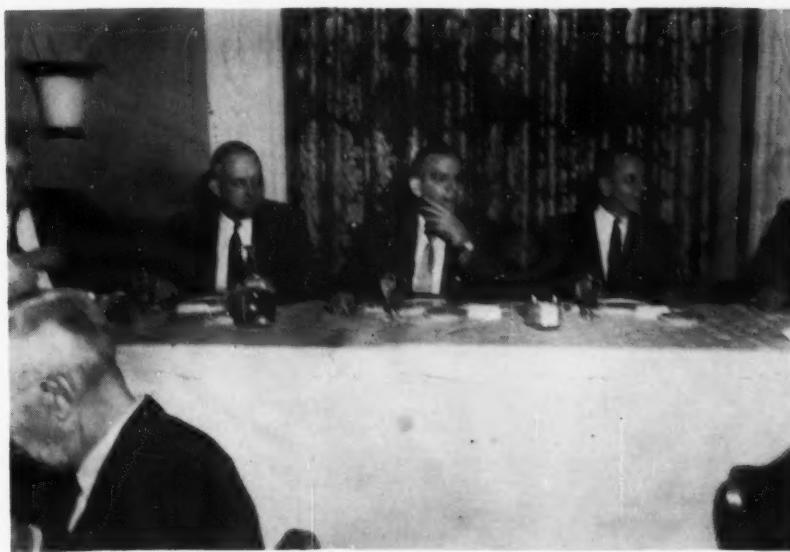
proval by the Bureau of the Budget; of getting the budgeted amount through the Congressional mill to an appropriation, with all the political implications of the process; and, finally, of disbursing the funds thus provided.

It is not a reassuring picture. A vast organization would be needed by the dispensing agency. It could easily become one of the greatest empire-building bureaucracies that the country has known. It would have to be vividly mindful of the fact that every college and university is in a Congressional district. Could the institution in such circumstances escape governmental intrusion in its affairs, or avoid a measure of eventual control from Washington? If we treasure our heritage of freedom in thinking, in learning, in teaching, we cannot take the risk of traveling this way.

#### Private Support Is Needed

What, then, is the alternative? There is only one. *The money needed to keep our colleges and universities solvent must be private, not public, money; and it must come from a great number and diversity of sources to assure complete independence from outside influence or control.*

The efforts that are being made by friends of education to encourage and develop increased giving by corporations are commendable and should continue. Such gifts, though significant, cannot be more than a partial solution. Sentiment already exists against too large a fraction of the supporting funds being derived from business and industrial corporate sources. Even if it were feasible to get all needed support from them, strong antipathy against doing so would surely develop.



Left: J. M. Lowe, Secretary-Treasurer, Julius Olzer, Chief, Dept. Mines, W. Va.; Lewis E. Evans, Deputy Secretary, Dept. Mines, Penna.; Henry Rose, President, Pittsburgh Coal Co.

Table 1. A table drawn to assist in explaining and illustrating how a simple revision of the income tax laws would operate to make the cost of giving commensurate with the giver's income.

I Group No.	II Highest surtax rate (%)	III "Gift surtax" (%)	IV Present cost of gift dollar (ct)
1	No surtax	2	80 to 69
2	20 to 31	3	68 to 59
3	32 to 41	4	58 to 49
4	42 to 51	5	48 to 39
5	52 to 61	6	38 to 29
6	62 to 71	7	28 to 19
7	72 to 81	8	
8	82 to 91	9	10 to 9

Desirable and helpful though they may be, gifts from business or industrial corporations are neither easy to come by nor easy to keep coming year after year. Boards of directors are trustees for the owners. They must be circumspect in either spending or giving away their stockholder's money. When the economic situation becomes unfavorable, prior actions are easily rescinded. Moreover, a large part of corporate aid is special-purpose money for specific projects or activities, to assure easy justification to stockholders. Although some special-purpose money can be well used, institutions would be hamstrung if the major part were of this kind. Keeping institutions in good balance in all fields of learning requires funds that, for the most part, are uncommitted.

In these considerations, then, there is left only one source for the kind and quantity of money needed. It is the individual whose income is enough to make him a potential donor. If he makes a federal income tax return, he is in this class. Of his kind there are many millions. He is a major source of the federal revenue. As a donor of gifts for the general welfare, especially education, he has not collec-

tively distinguished himself. There are, to be sure, outstanding exceptions among individuals in all income classes, and their generosity is most heartening. But at the very best, the total of their gifts cannot come near to meeting all needs. However generous, they cannot fairly be expected to carry the whole burden.

Although it may seem that our individual generosity is not notable, we are in fact a nation of givers, and we are almost unique in this respect. Were we not collectively generous, our government could not, year after year, maintain its program of foreign aid for non-military purposes. But we could not be collectively generous unless we were individually so. If, then, the present total of gifts for public causes is relatively low, the reason is to be found not in the individual's unwillingness but rather in his inability to be generous.

#### Income Taxes and Individual Giving

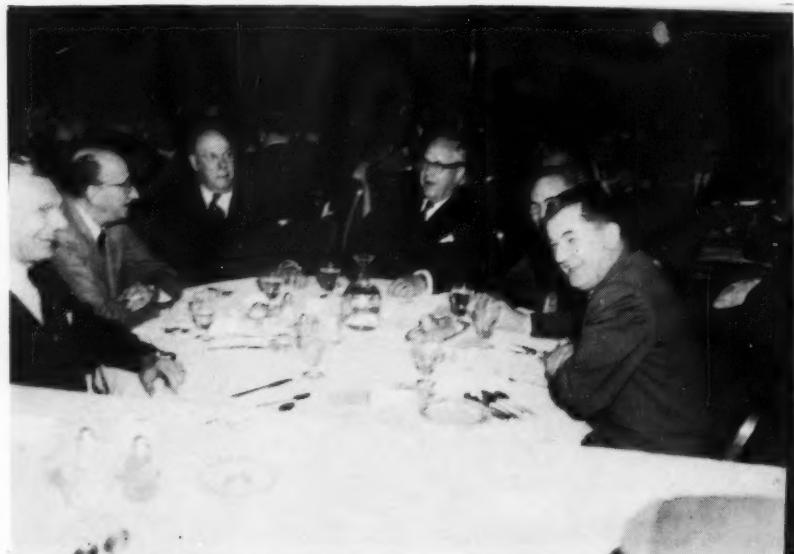
Notwithstanding the apparent unqualified approval by government of the taxpayer's charitable inclinations, expressed by its permission to him to deduct up to 30 percent of his adjusted gross income for legal charities, he failed in 1954 by about \$20 million to take advantage of this exemption. Deductibility of charitable gifts must,

therefore, be regarded as a gesture, not empty but unrealistic. Under this seemingly generous provision the government exposes itself to possible loss of substantial revenue—namely, the taxes on the billions that the tax payer might make as deductible gifts. Why has this provision failed so utterly to stir to vigorous action the generosity of individuals toward making gifts to worthy public causes?

Such gifts, approved by government, are called a *legal charity*. They are the "charitable contribution" now deductible from adjusted gross income in the computation of federal income tax. The term *legal charity* was superbly well defined in 1867 by Horace Gray, associate justice of the Massachusetts Supreme Court and later a justice of the United States Supreme Court: "A charity, in the legal sense, may be more fully defined as a gift, to be applied consistently with existing laws, for the benefit of an indefinite number of persons, either by bringing their minds or hearts under the influence of education or religion, by relieving their bodies from disease, suffering or constraint, by assisting them to establish themselves in life, or by erecting or maintaining public buildings or works, or by otherwise lessening the burdens of government." (Ital-

(Continued on Page 19)

Left: J. H. Reitz, Mgr. Mines, Republic Steel Corp.; Jack McKenna, Dept. Mines, Penna.; W. L. Affelder, V-Pres. Operations, Hillman Coal & Coke Co.; George Deike, Mine Safety Appliances Co.; W. Dan Walker, U. S. B. M.; Jesse Core, Chief Eng. U. S. Steel Corp.





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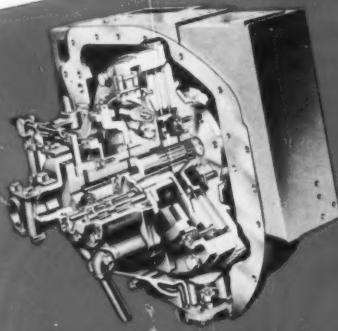
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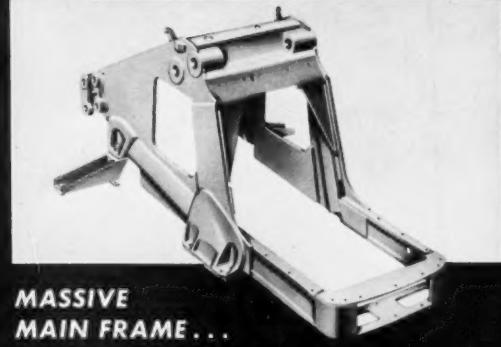
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<b>Standard Bucket Capacity</b> . . . . .	1 cu. yd.	1½ cu. yd.	2¼ cu. yd.
<b>Dumping clearance</b> . . . . .	7' 10-11/16"	8' 3¾"	9' 3¾"
<b>Dumping height</b> . . . . .	9' 10½"	10' 8"	11' 9½"
<b>Digging depth</b> . . . . .	10-5/16"	12½"	13½"
<b>Length</b> . . . . .	13' 10"	15' 1¼"	17' ½"
<b>Width</b> . . . . .	5' 10"	6' 8"	8'
<b>Height</b> . . . . .	6' 3¼"	6' 10½"	7' 3¾"
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DL1700

## HOW SHALL WE PAY FOR RESEARCH EDUCATION?

(Continued from Page 14)

ics are mine.) In view of the great number of government-approved legal charities, why have individuals declined by so wide a margin to make deductible gifts?

The answer is found in the glaring inconsistency between the government policy of approving gifts "to lessen the burdens of government" and its income tax laws. The curious if not startling fact is that *the tax laws operate to increase greatly the ability to give of those whose income makes them most able to give and to diminish drastically the ability to give of those whose income already renders that ability low.* The cost of giving for persons with a maximum surtax rate of 20 percent is almost 9 times that for those at the 91-percent maximum.

How does the disparity in the cost of the gift dollar arise? Consider one of the dollars given by the person whose highest surtax rate is 91 percent. It is tax-free. But if he had not given it, government would have taken 91 cents, leaving him 9 cents. Thus the dollar he gave cost him 9 cents. By like process, we find that the cost of the dollar for one whose highest rate is 20 percent becomes 80 cents.

Such disparity in cost of giving

between those of low and high incomes, respectively, does not harmonize with governmental approval of giving as now expressed in the income tax laws. *The zooming rise in cost of the gift dollar, with decreasing amounts of adjusted gross income, is a powerful deterrent, not an incentive, to liberality* (see Fig. 1A). This has undoubtedly been a major cause of the restraint by the individual upon his generous inclinations. To the person with income in the thousands or low tens of thousands, there is a double deterrent to giving. The first is that, after living expenses and other normal obligations have been met out of the year's income, the surplus remaining for savings and gifts is small; thus the intrinsic value of his surplus dollar is large—relatively much greater than it is for his counterpart with large income. The second deterrent is the amount that the gift dollar costs him. The effect is to put restraint on his generous impulses and to make him take the position that the government had better use the taxes he pays to finance the public causes that seek his donations.

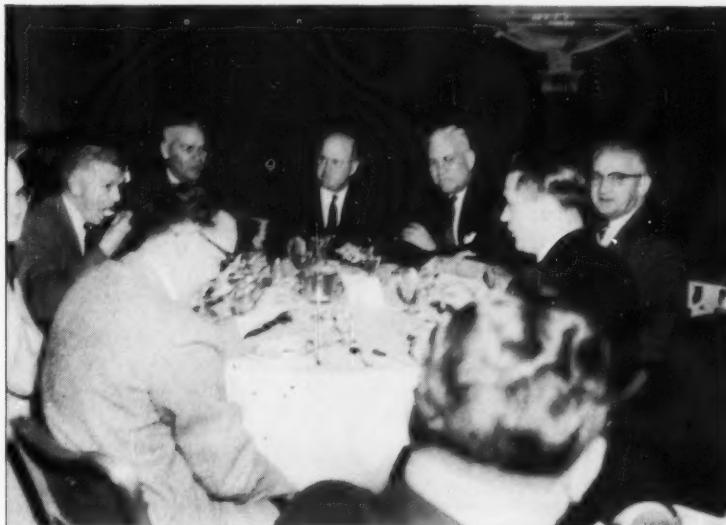
The inequity of the situation as it affects the individual who may wish to support worthy enterprises is clear, and its remedy is clear. *The cost of the gift dollar to the person with low income should be*

*no greater, and preferably less, than its cost to the wealthy donor.* The cost of giving should be commensurate with income. Giving should be possible for all taxpayers. With a well-designed plan for establishing the obviously fair principle that has been stated, there is little question but that greatly increased and probably adequate funds for all worthy public causes would be forthcoming. They would come from a substantial fraction of the 40 million people who now pay income tax on the basis of Form 1040, in accordance with their own choices and decisions. Such widely distributed giving is in the pattern of our tradition, an expression of the democratic process. It has been the mainstay of many of our necessary and valuable causes. With growing population, their increasing support becomes imperative. Education and research present the most immediate and most critical need.

### Recommended Revision in Tax Laws

To remedy the disparity in cost of gift dollars under the income tax laws involves relatively simple mechanics. Several methods can be devised by which a positive incentive to giving would replace the existing negative one, and which would end the incongruity between the tax laws and the government's approval of giving. The simplest of those which I have considered is illustrated in Table 1 and Fig 1B.

The plan contemplates classifying all who pay an income tax, other than those who use the standard deduction, in eight groups, as shown in column I. (For those with incomes under \$5000 who do not itemize deductions a modification of the plan is indicated.) Column II provides the basis, in terms of



Left: R. L. Boyd, Donald Morrow, Student; J. M. Jeffries, Atlas Powder Co.; James C. Gray, U. S. Steel Corp.; J. M. Jeffreis, Atlas Powder Co.; J. W. Woerner, Consulting Engineer; C. M. Donahue, Mine Safety Appliances Co.; C. Kormanik, Student.

highest surtax rates used, for the classification. Column III is an illustrative set of percentages, one for each group, to represent a "gift surtax." Column IV shows the present cost of the gift dollar for each group.

Under this plan the income tax would be computed as it is now except that gifts would not be deducted from adjusted gross income before making the computation. The resulting highest surtax rate would establish the individual's group. His total donations, up to some limit, such as percentage of adjusted gross income, would be a tax credit, to reduce the computed gross tax by the permissible amount. Finally, the "gift surtax," column III, would be added. This would be the cost of the allowable gift in each of the respective groups.

As an example, suppose that the taxpayer is in group 5, that his computed gross tax is \$10,000, and that his gifts total \$200. The gift credit, assumed to be within the permissible limit, reduces the tax to \$8000, to which is added the gift surtax of 6 percent of \$2000, mak-

ing the final tax \$8120. His gift dollar has cost him 6 cents, as compared with the present 9-cent cost at the 91-percent surtax rate.

The table and example are intended to be illustrative only. Thorough analysis is needed to determine appropriate rates for the gift surtaxes and the limitations on tax credits. These would have to be established with some flexibility in administration by the Treasury Department, so that small adjustments could be made during an experimental period of several years. Limits on tax credits and percentages established for gift costs would constitute values by which the flow of gifts is regulated.

Figure 1A graphically presents the cost of the gift dollar in relation to adjusted gross income, according to present laws. It is a striking illustration of the excessive cost of giving for those with incomes in the smaller number of thousands of dollars, as compared with the moderate cost for those with incomes ranging from the upper tens to hundreds of thousands. Figure 1B shows the present re-

lation between cost of gift dollar and the highest surtax rate and the same relation under the proposed plan.

The essence of the scheme is simple. At present the gift dollar costs the donor the amount shown in column IV of Table 1. Under the proposed plan it would cost him, in cents, the amounts shown as percentages in column III. This makes giving no less attractive than under present laws for the wealthy, but makes it much more feasible and hence more attractive for those with moderate or small incomes. The change in laws would give the many millions in, say, the lower four groups an opportunity that they are now virtually denied: to participate effectively in truly democratic support of education and other public enterprises.

That there will be strong objections to the plan may be surmised, and some of them are easy to anticipate. One comprehensive answer to any objection is that for education there is no possible third choice; either the mounting deficits will be financed by govern-

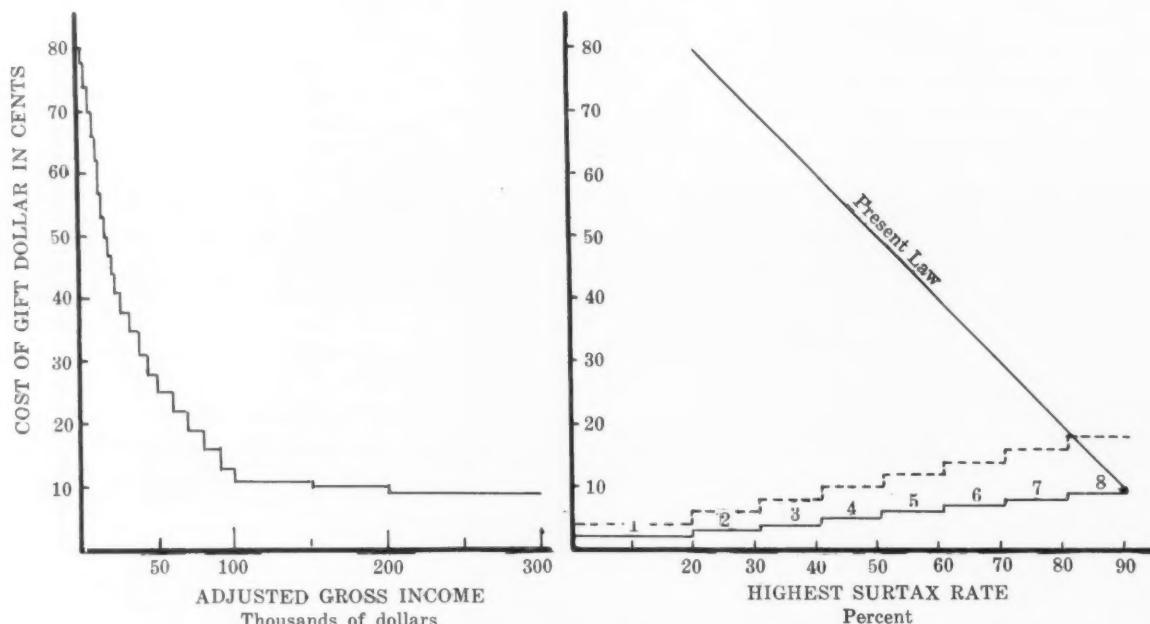


Fig. 1. (A, left) cost of gift dollar in relation to adjusted gross income. (Data from Internal Revenue instruction pamphlet for 1954, p. 14, schedule I.) (B, right) Solid step-graph shows proposed gift surtax in Table 1, column III. Dotted step-graph shows same but with rates doubled. Numbers on steps indicate groups, column 1.

ment, or they will be met privately. If the plan here proposed is not the answer, we face the challenge of devising a better answer. A decision must be made and action taken promptly, because the situation is critical and becoming worse.

There will be great reluctance in some quarters to do anything that might reduce gross public revenue. But we must look at the *net* increase, and, whatever it may be, it will be a low price indeed for the benefits to be derived. Here is a plan that would avoid not only the cost but the adverse political aspects of the channeling of funds through government. The gift dollar would reach its destination with its value intact. If it is forced through government channels, its value is reduced by one-half or more. Since in either case the money comes from the taxpayer, the saving made in eliminating government operations would leave his income after taxes higher, on the average.

One objection raised is that a plan of this kind would be putting the expenditure of public funds in the hands of private individuals. The reply is that the possibility exists now, in the permissive deduction up to 30 percent of gross income for gifts. In principle, there is no change; in operation

there is. It would not only introduce realism into the expressed approval of giving but would assure a distribution of the gifts in accordance with popular decision. The many millions of donors would constitute a valid statistical sample of the entire population. Hence their collective good judgment could be implicitly trusted, as experience and history prove. At any rate, it is not inferior in wisdom to that of a central disbursing agency.

Should it appear that the more emotionally motivated giving to some causes provided funds disproportionate to the needs, the controls built into the plan could be operated selectively. Obviously any plan must be wisely administered. Amendments to the income tax laws will always embody safeguards against abuses; the Congress will see to that.

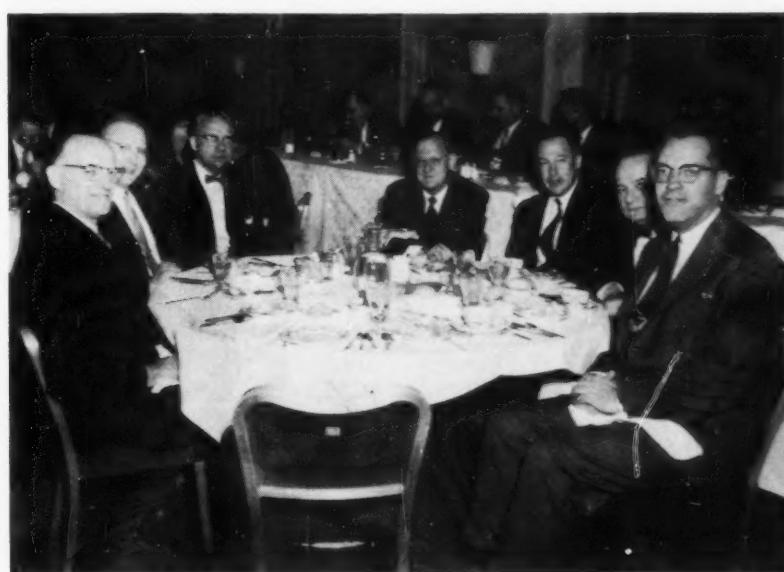
In its most important positive aspects, once the details of the plan were wisely developed and set in operation, it would solve the deeply rooted problems of education for the long term. As population and the need for more funds for education grow, the flow of support would similarly increase. It would help to solve the immediate problems of the school districts, the colleges, and the universities. There would be adequate funds for re-

search on disease and public health and for the support of the basic research which is one of the primary responsibilities of the institution of higher education. Community funds would benefit immediately, as would the Red Cross. Religious charities would become better able to carry on their humanitarian efforts among the underprivileged, the ill, and the disabled.

Apart from the substantial quick and long-term relief that would be provided the elementary and secondary schools, and the easement that the plan would offer higher education and other qualified causes, there is an aspect of even greater significance. Where the gift dollar goes, the giver's interest follows. His interest continues as he sees the dollar to its destination and observes the intended beneficial results. On the other hand, if the money thus to be used eventually is paid to the collector of public revenue, a curtain is dropped at that point against the taxpayer's further interest in his dollars, for their destination is now obscured. No better way has appeared to stimulate a citizen's interest, and to encourage him to become active in public causes, than to make possible his financial participation in them. He becomes a better citizen. We can, in the manner suggested, make millions of better citizens. It is the way our democracy has worked in the past. *This great and valuable asset to the success of our democratic process can be recaptured by making it possible once again for many millions of citizens to participate in private giving, in accordance with their own decisions.*

#### References and Notes

1. The opinions expressed in this article are entirely my own; they reflect no official position of the National Science Foundation.
2. Committee on Institutional Research, American Council on Education (Washington, D. C., 1954). Known as the Hancher Report.



Left: Kenneth Bartlett, Bethlehem Mines Corp.; J. E. Elkin, Duquesne Light Co.; Bill Hess, Jones and Laughlin Steel Corp.; J. J. Snire, Rochester & Pittsburgh Coal Co.; J. S. Whittaker, Pittsburgh Coal Co.; G. N. McClenan, Weirton Coal Co.



- This article is based on information supplied by the American Institute of Accountants, the national professional organization of certified public accountants, and checked for technical accuracy by the Internal Revenue Service.

\* \* \*

Long-range tax planning in today's business world of high tax rates is no longer "big business foolishness." Last-minute tax worrying with no year-round tax thinking can result in the loss of sizeable savings for small and medium-sized businesses when it comes time to file a tax return.

For example, assume that last summer you were forced to replace your air conditioner. You shopped around and found you could either sell your old unit to a private party for \$500, or a dealer in town would give you a trade-in allowance of \$500 on it. That seemed like six-of-one-half-a-dozen-of-another to you; so without thinking—or worrying—about tax matters you traded in the old air conditioner.

To prove how much a seemingly simple business decision such as this can affect how much you will have to pay, let's assume further that the air conditioner which you traded had originally cost \$2500 and that you had taken \$1000 in depreciation on it. This meant its cost for tax purposes was \$1500, and you were going to "lose" \$1000 whether you accepted the dealer's trade-in allowance of \$500 or sold to the private party for \$500.

So far still six-of-one-half-a-dozen-of-another, but now since you elected to trade-in your old air conditioner, let's see how you can claim a deduction on a tax return for your \$1000 loss. The answer

is simple. You can't. All you can do is add the amount of the loss to the cost of your new unit, and eventually receive tax credit for your loss in the form of slightly higher depreciation deductions.

On the other hand, if you had made a bona fide sale of your old unit to the private party and a separate purchase of a new unit from a dealer, you would have established a \$1000 loss which could be claimed as a loss deduction on a tax return and used to offset regular income.

It is not always true, of course, that a loss deduction on the tax return is worth two in the bush of depreciation, but a general rule to consider when you are trying to decide whether it would be more advantageous taxwise for you to sell or trade-in an asset is: sell "loss" property to obtain a deduction, and trade "profit" property to avoid the tax which must be paid on any profit realized from the sale of an asset.

You may find that you have sold yourself into a capital gains tax or traded yourself out of a loss deduction if you have not figured your depreciated costs correctly. This is a matter you should discuss with a verified public accountant. Not only can he verify the accuracy of your mathematical computations, but he can also explain the advantages and disadvantages of the various methods used to compute depreciation. It could be that the method you used or are using is

not the one most suited to your business needs from a tax standpoint.

For example, if you asked a CPA whether you should use the straight-line or declining balance method to depreciate your new air conditioner, one of the first questions he might ask you would be: what are your cash requirements and what are your profits likely to be? If you are thinking of expanding and need additional cash within the next few years, he might recommend that you use the "new" declining balance method to compute depreciation.

The declining balance method "speeds up" or increases depreciation rates. This starts the chain reaction to your objective of retaining cash in the business, because when you increase depreciation rates you also increase allowable depreciation deductions on your tax return. The amount you may write-off the first year is twice what it would be if you used the straight-line method; so by applying a \$1000 instead of \$500 depreciation deduction against your regular income, you are going to reduce your taxes, and cash that does not have to be paid out in federal taxes can be retained in the business for expansion purposes.

It seems all good things eventually come to an end, however, and while in the first year the declining balance depreciation rate may be double that of the straight-line, this differential diminishes in succeeding years until declining balance deductions are even less than they would be under the straight-line method. This is why it is important that you consider current and future earnings before you select a depreciation method.

For example, if your current earnings are low, or if you are putting in a new line of merchandise and the results of this expansion will take a few years to show in your earnings, it might be more advantageous taxwise for you to use the straight-line method of computing depreciation.

The straight-line method does not "speed up" depreciation deductions. It spreads them out equally over the estimated useful life of the asset; so when you use a straight-line method you are saving, in a sense, for a rainy day. When your earnings improve or increase, you will have more substantial depreciation deductions to apply against those earnings. There usually is no point in increasing a loss or reducing low earnings by claiming additional depreciation deductions when you do not need them.

A point to remember when you are trying to decide whether to buy new or used equipment is that second-hand equipment *must* be depreciated by the straight-line method. This tax factor should be considered, because loss of the opportunity to use the declining balance method with its rapid write-off feature may cancel any immediate savings effected by the purchase of used equipment.

The matter may have been decided and forgotten many years ago, but a basic question businessmen should consider from time to time—and one which has many tax implications—is whether to do business as a proprietorship, partnership or corporation. There may be personal or professional factors that force the selection and maintenance of a non-corporate form of organization, but depending on the earnings of the business and the amount of those earnings you may need to withdraw, there are certain tax advantages to be gained by incorporating a new or expanding company.

Since proprietorship and partnership income is taxed at individual rates, which range anywhere from 20 percent to 91 percent, and corporation earnings are taxed at corporate rates of 30 percent on the first \$25,000 earned during the year and 52 percent on the excess, it might appear that if you have relatively low income the proprietorship-partnership rates

are lower. However, you must also consider that the corporate tax carries with it the privilege of deducting a reasonable salary paid to an employee-owner. The employee-owner has to pay a personal tax on his salary, of course, but if he were not incorporated, he would have to pay a personal tax on all the money earned by the business.

If the retained earnings of the company are taxed at a corporate rate which is lower than what the personal tax rate would be, the employee-owner would benefit by having additional funds available in the corporation for expansion purposes. These funds may be accumulated in a corporation up to \$60,000 without further tax penalties, and even higher if the corporation can prove a need for them.

These advantages—while they may cut your current tax bill and increase working capital for expansion needs—can be lost if you have jumped into a corporation without first reviewing your own long-range cash requirements. If you are continually forced to withdraw money from the corporate earnings to pay personal expenses, you will have to withdraw these funds in the form of dividends. That means the corporation will have to pay tax on the earnings you are withdrawing as dividends, and you will have to pay tax on the dividends received. The "double tax" on earnings and dividends can nullify any tax advantage from incorporation when earnings must be withdrawn immediately as dividends.

Many businessmen seek professional advice about tax matters as they do professional assistance with their golf game—when the slice has become almost unbearable. You can save tax dollars by realizing that business decisions made in the fall affect the amount of tax you must pay in the spring. Practice year-around tax thinking, and consult a certified public accountant when you are in doubt as to the tax effect of even the most routine business decision.

## EQUIPMENT IN THE FIELD



Above: Michigan Tractor Shovel Model 175-AD Scarifier application in strip mining breaking out a parting seam with scarifier on reverse path. Scarifier teeth do not interfere with normal bucket operation.



Above: An Allis-Chalmers Diesel-powered torque converter drive crawler tractor HD-16 leveling spoil in an Ohio coal mine.



Above: Caterpillar D9 Tractor equipped with No. 9S Bulldozer is backfilling and leveling material on land reclamation job after stripping coal for Bookwalter Bros. Coal Co., Clearfield, Pennsylvania.



Above: Caterpillar DW21 Tractor with Athey PR21 rubber-tired trailer is used for hauling rock on coal mining operations at Newport Excavating Co. coal strip operation near Sheatown, Pennsylvania.



Right: Caterpillar D9 Tractor equipped with No. 9S Bulldozer strips 30' of overburden from 26" seam of soft coal. Overburden consists of shale, rock and clay at James E. Hoffman Coal Co., Marthas, Pa.

## FALL MEETING OF THE PITTSBURGH COAL MINING INSTITUTE



George L. Alston reading his paper.

On this planet earth man's achievement far surpasses any other species.

From the time the crust of this earth became solid, some 5,000 million years ago, when accumulations of Molecules started going through evolution sequences as environments changed, later evolving into multicellular plants and animals, one of which is present day man, to strive for betterment was a logical step from the very beginning of life. Differentiation of cells and evolution of tissue and organs made possible the nervous system in man. This extraordinary development of the nervous system set man apart from his contemporary species and underlies the development of his present intellect that enables him to carry through complex reasoning processes.

Ability to acquire and communicate knowledge, allows man to supplement biological inheritance with cultural inheritance. Ancient and modern civilizations with their arts, music, literature, religions and technologies are products of cultural inheritance. Modern science and technology made possible the industrialization of our time. Recent evolution of culture, particularly in technologic and in-

dustrial fields, created an entirely new set of opportunities with interrelated problems.

The continuation of our present prosperity is going to require more technology and greater extension and evolution of industry. Consumption of energy and raw materials is going to rise rapidly. Education will have to be raised and better use of intellectual manpower will be necessary.

Heredity understanding that a man gained recently enables him to direct the evolutionary future of animals and plants he cultivates. That knowledge also allows him to deliber-



S. P. Polock, Bureau Mines, reading his Paper. Charles E. Fisher, President of the Institute is seated at the left.

ately direct the course of his own biological evolution and to transcend limitations of natural selection that have for so long directed his evolution.

Together with knowledge will have to be collective wisdom and courage not yet shown by any group of men. Faith will also be essential. With these qualities and determination to go on, man is capable of attaining heights far greater than his achievements of the past. Men in the coal mining industry are part of the human race, thus must and will play

their part in the role of human cultural and industrial advancement.

Institutes like the Pittsburgh Coal Mining Institute and other gatherings of coal men are lagging far behind advances in education and technological developments in placing on their programs subjects for enlightening the man in the coal industry.

The Fall Meeting of the Pittsburgh Coal Mining Institute was held in the High School Auditorium at Carmichael, Pa. Tuesday Evening, November 27. The Program was under the chairmanship of Ralph C. Beerbower, Assistant General Manager Mines of the U. S. Steel Corp. James C. Gray, General Manager Mines, U. S. Steel Corp. spoke on the New Approach to Accident Prevention. S. P. Pollock, Pittsburgh Branch, U. S. Bureau of Mines read a paper entitled The Preliminary Results of Survey of Fire Resistant Hydraulic Fluid. This paper will appear in another mining journal. George L. Alston, Mine Safety Appliances Co. presented a paper Rock Dusting in Conjunction with Continuous Miners. This paper appears in this issue.



James C. Gray Manager, Mines, U. S. Steel Corp. discussing Accident Prevention.

## ROCK DUSTING IN CONJUNCTION WITH CONTINUOUS MINERS

One of the many problems faced by the bituminous coal companies using continuous miners is that of maintaining rock dust to within 40 feet of all working faces. Since the advance of a miner usually exceeds 100 feet per shift, some dust must be applied on shift and preferably with no interruption of coal production. In addition to

maintaining dust to within 40 feet of the face, other rock dusting problems arise due to the increased volume of air carried over the miner and the excessive amount of float coal dust which is produced by the miner and carried into the return airways.

At the present time, dust application is carried out by three dif-

ferent methods. Hand dusting is a slow and therefore costly method and is seldom used on continuous miner sections. Machine dusting with a conventional distributor, which applied the dust dry, is still the most widely used method today. This method of dust application is by far the cheapest, both from the standpoint of application cost and from the amount of dust required to give full protection. The rock duster, hose and sacks of rock dust are kept as near the face as possible. Rock dust is applied between shifts and quite often on shift when the miner is out of operation due to mechanical breakdowns, shortage of cars, or during lunch periods. With a dry rock dust distributor dust can be applied to rib and roof at a rate of twenty lineal feet per minute and in most cases redusting is not required. Dust is spread on the bottom by scrapers attached to the underside of shuttle cars or simply by breaking the sacks and spreading with a hand shovel.

The third method of dust application is to apply the dust in a slurry form, on shift without interrupting the operation of the miner. Two different methods are now in use. In one method the rock dust is premixed with water in a tank at a ratio of seven to eight gallons of water per hundred pounds of dust. Compressed air, either from the mine supply or from a portable compressor, forces the slurry through the hose and with a spray nozzle the slurry is applied to ribs and roof.

The other method of slurry application is with a small conventional dry rock duster. A specially designed mixing nozzle is attached to the end of the rock dust hose. A water line is attached to the nozzle. As the dry rock dust and air come through the nozzle, the water is introduced and a slurry is

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discharged. The water flow is controlled by the gate valve at the nozzle. A ratio of six gallons of water to one hundred pounds of dust makes a thick slurry which adheres readily to ribs and roof. As much as one-hundred-fifty feet of rock dust hose can be used with this set-up, and a water pressure from fifty to one-hundred-fifty pounds per square inch is satisfactory. The usual procedure is to store the distributor along with the dust hose, water hose, and the rock dust in a convenient cross-cut. When the miner has advanced forty feet, the hose is pulled into the working place, two sacks, or one-hundred-sixty pounds of dry dust are put into the hopper, the water is turned on at the nozzle, and the power is turned on the distributor. The resulting slurry at the nozzle is applied to ribs and roof of the last forty feet of exposed coal. Four minutes are required for this application. The procedure is repeated each time the miner exposes another forty feet of unrockdusted entry or cross-cut. In the process of mixing the rock dust and water in the nozzle, not all the rock dust is wetted and some dry dust escapes during the application. This dust is not harmful and, providing the slurry is applied in short intervals, the visibility of the men on the section is not impaired.

The advantage of using the conventional distributor is that, as well as applying wet dust on shift, dry dust can be applied on off shifts, between shifts, and even on shift in return airways to supplement the dust that was applied in a slurry form.

The application of wet rock dust has some disadvantages. Where the humidity is high, many days are required for it to dry and the float coal dust that accumulates on the surface creates a hazard which can only be overcome by an additional application of rock dust.

Most rock dusts, when wetted and dried, form a cake which is not readily dispersed when an explosion occurs. Therefore, supple-

mentary dusting which is done after the slurry is applied, should be done dry. The combination machine lends itself very well to taking care of both the original slurry application and supplementary dry application of rock dust.

There are still a number of questions to be answered before any final decision can be made as to what is the most economical method of rock dust application. Some of these questions are: How should samples be taken in a wet rock dusted area where the rock dust has a muddy consistency and a layer of dry float coal dust has been deposited on top? How should samples be taken in a wet rock dusted area where the rock dust has dried in a cake? The Federal Mine Law Specifications for rock dust require that the dust must be of such nature that, when wetted and dried, it will not form a cake. Of the many rock dusts we have had an opportunity to check, only one has the quality that, when wetted and dried, returns to a powder. What degree of caking is allowable in rock dust?

Most companies using continuous miners, either apply the dust dry when convenient or apply the dust wet, then supplement the wet dusting with dry dusting when convenient.

To reduce the danger of an excess accumulation of float coal dust and to reduce the amount of rock dust required for original application as well as the amount of rock dust required for second and third applications, the problem should be attacked at the source where the coal dust is being produced. The efficient use of sprays on the miner not only reduces the amount of coal dust being airborne into the returns from the cutting heads, but so wets the coal that little is put into suspension at transfer points behind the miner. Cleanup behind the miner, going so far as to wash down the roof and ribs with water, reduces the amount of rock dust required on first application. Cleanup on the bottom as well as

control of spillage from extendable belts and shuttle cars reduces the amount of rock dust required on the bottom. In other words, by controlling the coal dust at its source and by cleaning up as much coal dust as possible before the first application of rock dust, the quantity of rock dust required for adequate protection can be reduced considerably.

**G. L. Alston**

• Production of a new single front mounted telescopic hoist, capable of raising and dumping in less than six seconds, is announced by Hercules Steel Products Company, Galion, Ohio.

Known as Model 1215, the new 5 in. telescopic hoist has been designed for use on high-speed batching operations or wherever fast dumping action is essential. The hoist is said to raise to full dump position in 6 seconds. A special new Hercules-designed bleeder valve provides hydraulic cushioning at the end of the lifting stroke to prevent cylinder damage. Accelerating the truck engine at the top of the stroke provides a rapid 4 to 10 in. rising and falling motion of the body. This assures complete, fast, clean dumping, without "frogging" the truck, it is claimed.



**Hercules Model 1215 high-speed telescopic hoist with Hercules Model CD body and Model 15 batch boxes.**

A Hercules heavy-duty high output pump provides the large volume of oil necessary for high-speed hoist action, the manufacturer states. Cooler operating temperatures are said to be afforded by the 22 gal. capacity of the hoist system.

For further information, contact local Hercules distributors or write direct to Hercules Steel Products Company, Galion, Ohio.

• Traffic control, difficult even under ordinary surface circumstances, can become a major "headache" in a deep ore mine.

But the Sullivan Mine of The Consolidated Mining and Smelting Company of Canada, Limited, world's largest lead-zinc-silver ore producer, has placed emphasis on the "control" in traffic control by establishment of a communications center.

In this "brain" of the Sullivan Mine, which is at Kimberly in the southeastern section of British Columbia, a complete two-way communications system has been established at the main level.

Six electric locomotives which operate in a 10-mile underground area are equipped with M-S-A MinePhones, a product of the Mine Safety Appliances Company of Pittsburgh, Pa.

Amid an array of electrical equipment, the traffic control man keeps a watchful eye on all locomotive movements in the mine. Before installation of MinePhones, traffic control depended on a block signal system and regular telephones.



Genuine smiles result from a study of the Sullivan Mine's monthly production forecast. Underground Foreman Rod MacQuarrie, left, Transportation Foreman Jack McSporran, center, and Senior Mucker Chief Archie Liley consider good communications invaluable in maintaining the required production levels.

Now, operators of moving locomotives can talk directly to traffic control. Since the system is a "party line," other motormen and supervisory personnel receive the message simultaneously, which increases efficiency and has safety value. This improvement was welcomed by the mine's 1,000 employees.



Robert Rose, control chief of the Sullivan Mine, Consolidated Mining and Smelting Company of Canada, Ltd., uses the M-S-A MinePhone in the traffic control room of the mine. The control room is also equipped with electronic devices to trace the movements of electric locomotives within the mine area.

News of emergencies can be instantly relayed to persons concerned. If an underground ambulance is needed, tracks can be cleared in seconds.

Simply by picking up a "mike" an operator can make requests for supplies and transportation. This facilitates unscheduled pickups and deliveries.

The M-S-A MinePhone system is powered by the 250-volt direct current which runs the locomotives. The sets, which are completely insulated, employ a frequency-modulated FM carrier of 88 kilocycles, which does not interfere with the mine's conventional telephone system.

Sullivan Mine employees say the communications system is one of the greatest improvements in operating equipment since the mine was discovered in 1892. It is a con-

tinuation of the modernization program inaugurated by "Cominco" which took over the property in 1909. (Approximately 70 million tons of ore have been extracted since the mine was acquired by Cominco.)

"This improvement can be classified with the steps forward from hand-driven drills to pneumatic ones, from muck sticks to mucking machines, and from hand tramping to electric locomotives," one veteran employee stated.

Using the MinePhone system, workmen can flash word of breakdowns, faulty track conditions, derailments, or accidents to parties concerned. Delays which might lengthen a tie-up are prevented.

Designed to withstand a great deal of abuse, the M-S-A MinePhone equipment is mounted on each locomotive in a shock-resistant cradle in a dust tight splash-proof metal case. The weather-proof loudspeaker and microphone can be mounted at any place convenient to the motorman.



As Tom Clarricoates, left, checks the daily supply record in the Sullivan Mine, Rod Clark uses the M-S-A MinePhone to check with the control room before he moves out with the "Jeep," a single motor unit used to move supplies, engineers, and visitors in the mine.

Normally, the unit is in receiving position for a call. When making a call, the operator presses a button on the side of the "mike" opening his transmitter unit and disconnecting his receiver.

Men of the Sullivan Mine consider good communications invaluable in maintaining the mine's production level of 11,000 tons per operating day. The M-S-A MinePhone System is a top time and trouble saver which has made their job safer, easier, faster, and more economical.

#### STATEMENT OF OWNERSHIP

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The owner is P. F. Jasik, 4575 Country Club Dr., Pittsburgh, Pa., and there are no other stockholders, bondholders, or mortgagees.

P. F. Jasik

Sworn and subscribed before me this 8th day of October, 1956.

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EQUIPMENT

- Appointment of D. J. Redmond as Director of Sales of Hercules Galion Products, Inc., is announced by E. P. Monroe, president.



D. J. Redmond, newly appointed Hercules Galion Director of Sales.

In his new post, Mr. Redmond will be responsible for sales activities of the corporation's Hercules Steel Products Company, Galion Allsteel Body Company, Unisteel Body Company and Hydro E-Z PACK Company divisions. Mr. Redmond is an engineering graduate of Case Institute of Technology. Prior to his appointment as Director of Sales, he served as assistant to Hercules Galion's senior vice president, O. C. Henkel.

• Island Creek Coal Co. has acquired the properties and other assets of Algoma Coal and Coke Co., located in McDowell County, W. Va. Algoma is currently producing about 400,000 tons annually from the Pocahontas No. 3 seam, and Mr. Salvati said production will be increased substantially. Mr. Beury will become affiliated with the Island Creek organization.

• G. Albert Stewart, executive secretary of the Central Pennsylvania Open Pit Mining Association since 1947, died at his home in Clearfield, Pa., on Dec. 3 after a heart attack. Funeral services were held Dec. 6. Mr. Stewart was 66. He is survived by his wife and three daughters.

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**\$11,800.00**

f.o.b. Pittsburgh, Pa.

**Item 555-B157**—Caterpillar D8 Tractor with LeTorneau Bulldozer and LeTorneau Single Drum Power Control Unit. Has worked approx. 30 days since new track assemblies, sprockets, and track roller assemblies were installed. Balance of Tractor in good working condition.

**\$6,880.00**

f.o.b. Bradford, Pa.

**Item 1055-P285**—Caterpillar D8 Tractor, mounted with Le Tornneau Straight Blade and Rear Control Unit. Machine is in operating condition, with fair running gear.

**\$3,000.00**

f.o.b. Pittsburgh, Pa.

**Item 856-P490**—Caterpillar D7 Tractor with Cat No. 25 Cable Control and Straight Blade. Replaced moldboard; replaced cutting edge and end bits; installed new carrier rollers; tracks are 90% of new installed one new sprocket; replaced seals and bearings in final drive; replaced pinion seal and one new flange; installed new seals and bearing in transmission; reconditioned steering clutches; installed new master clutch; tuned starting engine, serviced diesel engine; bottom rollers are good.

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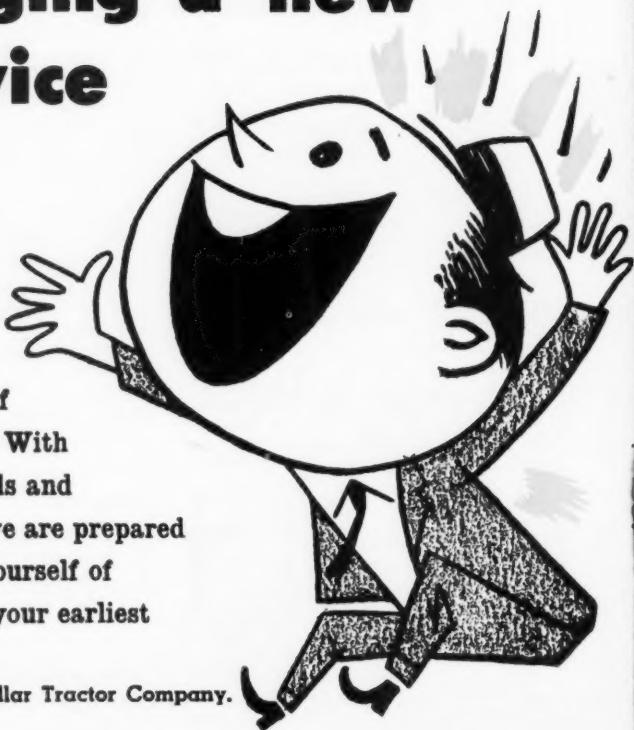


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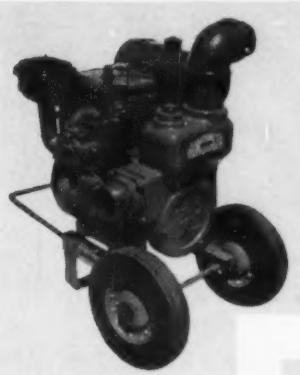
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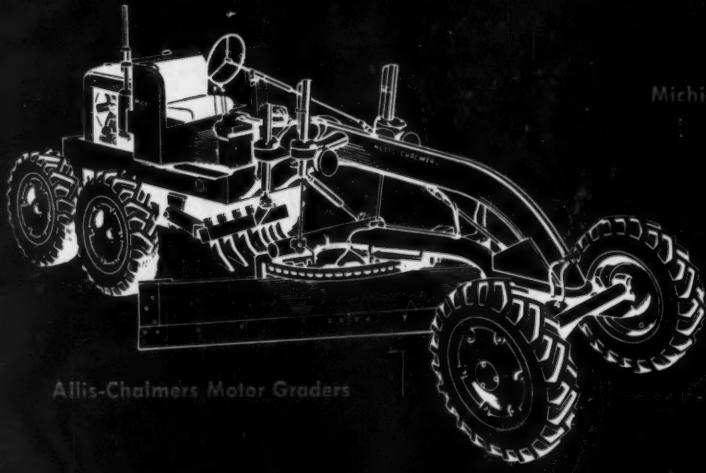
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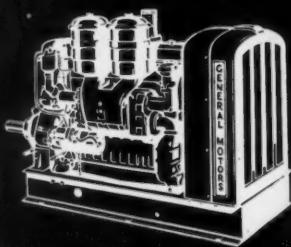
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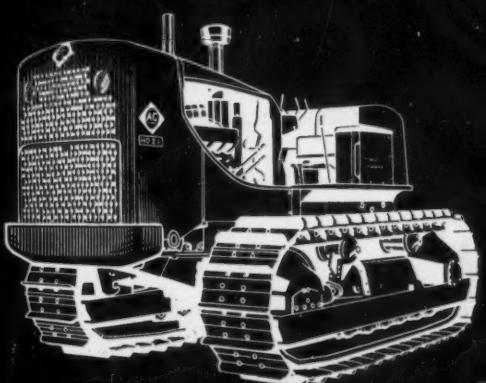
Allis-Chalmers Motor Graders



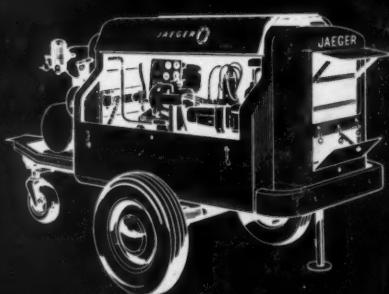
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General Motors  
Diesel Engines



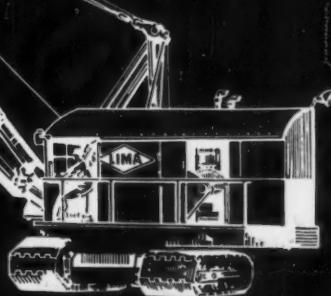
Allis-Chalmers  
Tractors



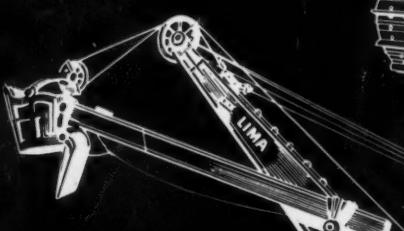
Jaeger  
Compressors



Jaeger Pumps



Lima Shovels, Cranes, Draglines



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